CLAIMS

1. A variable frequency oscillator comprising:

a variable frequency oscillator core;

an oscillator controller; and

an output voltage stabilisation device for maintaining an amplitude of an oscillator output within a predetermined range,

wherein the variable frequency oscillator core is controllable to operate in one of a plurality of frequency bands and has a frequency control input responsive to the oscillator controller, and where in order to set a new operating frequency the oscillator controller performs a frequency search through the bands to identify an appropriate band and wherein amplitude stabilisation is performed during the frequency search through the bands.

2. A variable frequency oscillator as claimed in claim 1, in which the frequency search is a successive approximation search.

3. A variable frequency oscillator as claimed in claim 1, in which following selection of a frequency band the amplitude of the oscillator is controlled to attain a target value prior to testing the operating frequency of the oscillator.

4. A variable frequency oscillator as claimed in claim 1, in which the oscillator is in series with a current control device and the magnitude of the current through the current control device can be varied in order to control the amplitude of the output signal of the oscillator, and wherein the current control device is digitally controlled.

5. A variable frequency oscillator as claimed in claim 4, wherein the current control device comprises a plurality of resistors arranged in parallel, each resistor having an electrically controllable switching device associated with it such that current flow through each resistor can be selectively enabled or inhibited.

6. A variable frequency oscillator as claimed in claim 4, in which the current control device comprises a plurality of current sources connected in parallel, and the current sources are individually controllable to switch them on or off.

7. A variable frequency oscillator as claimed in claim 6, in which the current sources are binary weighted.

8. A variable frequency oscillator as claimed in claim 4, in which the oscillator controller is responsive to a measurement of amplitude of the oscillator, and the oscillator controller adjusts the current in the current control device so as to maintain the amplitude of the oscillator in an acceptable range.

9. A variable frequency oscillator as claimed in claim 8, in which the oscillator controller selects the current to flow in the oscillator on the basis of a substantially monotonically increasing change in current until the correct amplitude is reached.

10. A variable frequency oscillator as claimed in claim 9, in which the oscillator controller performs a coarse search of the current required to reach an acceptable amplitude, and then refines this with a fine search so as to refine the current supplied so as to control the amplitude of the oscillator.

11. A variable frequency oscillator in which a current in the oscillator controlling the magnitude of oscillation is monotonically increased in steps of a first size until such time as a first target oscillation amplitude is exceeded.

12. A variable frequency oscillator as claimed in claim 11, in which once the first target oscillation amplitude is exceeded the current is decremented.

13. A variable frequency oscillator as claimed in claim 12, in which the current is decremented by at least the first step size.

14. A variable frequency oscillator as claimed in claim 11, in which after the first target oscillation amplitude is exceeded the amplitude is successively increased in steps of a second step size less than the first step size until such time as the amplitude exceeds a second target amplitude.

15. A variable frequency oscillator as claimed in claim 1, in which the oscillator is a voltage controlled oscillator and the oscillator frequency is controlled by a phase locked loop, and wherein a correction factor varying as a function of frequency is applied to the voltage controlled oscillator.

16. A variable frequency oscillator as claimed in claim 1, in which amplitude stabilisation is performed only during tuning of the oscillator via band selection.

17. A method of setting a frequency of a oscillator having an amplitude control, the method comprising repeating the steps of:

a. Making an adjustment to the frequency of the oscillator;

b. Adjusting an amplitude of oscillation of the oscillator to attain a target amplitude; and

c. comparing the oscillator frequency with a target frequency.

18. A method as claimed in claim 17, in which the amplitude of oscillation is adjusted using a search procedure in which an adjustment is made to an amplitude control parameter, and the resultant amplitude is measured and a further adjustment of the amplitude control parameter is made if the amplitude has not attained the target amplitude.

19. A method as claimed in claim 17, in which the amplitude control parameter is increased from a minimum value towards a maximum value until the target amplitude is achieved.

20. A method as claimed in claim 19, in which a coarse setting procedure is used to find an approximate amplitude by incrementing the amplitude control parameter using a first step size, and once the value has been approximated a fine setting procedure is implemented in which the changes of a second step size, smaller than the first step size, are made to achieve the target amplitude.

21. A method as claimed in claim 17, in which the oscillator amplitude is controlled by virtue of the current supplied to the oscillator and the current is controlled in a digital manner to control the amplitude of the oscillator.

22. A method as claimed in claim 21, in which the current is supplied by a plurality of electronically controllable current sources, and the current sources are binary weighted, and selected ones of the current sources are switched on to achieve a desired current.

23. An amplitude control system for an oscillator, wherein the control system is responsive to measurement of oscillator amplitude and compares this with a target amplitude to derive an amplitude error value, and wherein the amplitude error value is used to control a digital amplitude controller such that changes in an oscillator amplitude control signal are quantised.

24. An amplitude control system as claimed in claim 23, wherein the amplitude error value is merely indicative of whether the oscillator amplitude is one of greater than and less than the target amplitude.

25. An amplitude control system as claimed in claim 24, in which the control system successively increments the oscillator amplitude from a minimum value to the target value.

26. An amplitude control system as claimed in claim 25, in which during a first phase of amplitude control the amplitude control signal is incremented in steps of a first step size until a first acceptable approximation to the target amplitude achieved, and thereafter a second phase is implemented in which adjustments of a second step size are made to achieve a second acceptable approximation to the target value, the second step size being smaller than the first step size.

27. An amplitude control system as claimed in claim 26, in which the first acceptable approximation of the target amplitude is smaller than the second acceptable approximation of the target amplitude.

28. An amplitude control system as claimed in claim 26, in which once the first acceptable approximation is exceeded, the amplitude control signal is decremented by the first step size before proceeding to the second phase.

29. An amplitude control system as claimed in claim 23, wherein the amplitude control signal is used to drive a digitally controlled current supply device.

30. An amplitude control system as claimed in claim 29, wherein the digitally controlled current supply device comprises a plurality of current mirrors arranged in parallel, the current mirrors being individually controllable between being on and off.

31. An amplitude control system as claimed in claim 30, wherein the current mirrors are binary weighted.

32. An amplitude control system as claimed in claim 29, wherein the digitally controlled current supply device comprises at least one current mirror which is permanently on.

33. A method of controlling the amplitude of a voltage controlled oscillator having an amplitude control input, the method comprising the steps of determining an error between the oscillator amplitude and a target amplitude, and on the basis of the error measurement making a discrete adjustment to a signal supplied to the amplitude control input, the signal supplied to the amplitude control input being constrained to be one of a plurality of discrete values.

34. An apparatus for performing frequency compensation of a "constant of proportionality" of a voltage controlled oscillator, comprising a constant of proportionality modifier for modifying the constant of proportionality used in a frequency control loop as a function of a target frequency of the voltage controlled oscillator.

35. An apparatus as claimed in claim 34, in which the control signal modifier produces a correction signal which varies as the square of the target oscillator frequency.

36. An apparatus as claimed in claim 34, in which the control signal modifier includes a look-up table in order to derive the correction to the control signal.

37. A method of performing frequency compensation of the constant of proportionality of a voltage controlled oscillator within a phase locked loop, the method comprising the steps of

1. reading a target frequency for the voltage controlled oscillator.
2. deriving a correction value based on the target frequency.
3. supplying the correction value for use, either directly or indirectly, by the voltage controlled oscillator.

38. A method of performing frequency compensation of the constant of proportionality of a voltage controlled oscillator, the method comprising the forming of a frequency error signal, using the frequency error signal to drive the oscillator, and using the frequency error signal to derive a further correction signal.

39. A voltage controlled oscillator for use in a telecommunications device, wherein amplitude and frequency control parameters of the voltage controlled oscillator are varied depending upon the mode of operation of the telecommunications device.

40. A controllable current source in combination with a voltage controlled oscillator wherein the current source provides current to the voltage controlled oscillator for controlling the amplitude of oscillation thereof and wherein the current source comprises a plurality of current mirrors arranged in parallel.

41. A controllable current source as claimed in claim 40, in which the current mirrors are digitally controllable.

42. A mobile telephone including a voltage controlled oscillator as claimed in claim 1.